

# Notice of Allowability

Application No.

10/798,898

Examiner

Russell Frejd

Applicant(s)

HOUSTON ET AL.

Art Unit

2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment received 12 December 2006.
2. ☒ The allowed claim(s) is/are 1-9.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

*Russell Frejd*  
**RUSSELL FREJD**  
**PRIMARY EXAMINER**

In re Application of: Houston et al.

***Allowance of Application # 10/798,898***

1. The following communication is in response to applicant's amendment received 12-December-2006. Claims 1-9 are pending in the application. The examiner respectfully notes that the some of the amendments to the Specification include page /line numbers that do not match the electronic copy of record. The examiner provides the following correlations:

The paragraph on page 9, lines 4-6, actually are on page 10, lines 1-3.

The paragraph on page 10, lines 8-17, actually are on page 11, lines 8-15.

The paragraph on page 13, lines 10-21, actually are on page 14, line 17 through page 15, line 6.

The paragraphs on page 14, lines 5-16, actually are on page 15, line 13 through page 16, line 2.

***Examiner's Amendment***

2. An Examiner's Amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 C.F.R. 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the Issue Fee. Authorization for this Examiner's Amendment was given via an e-mail from Ryan Dupuis (Reg. No. 47,345) on 28-February-2007, and in a telephonic interview on 2-March-2007 (the "computer-implemented" additions).

2.1 In the Claims: (In the format of the received amendment)

Claim 1                      line 1                      Change "method" to --computer-implemented method--.

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	line 19	Delete "and".
	line 22	Change "component." to --component; and--.
	line 23	Add --storing the values of the velocity vectors associated with the cells contained within said at least one impermeable object with said normal components being removed therefrom.--.
Claims 2-6	line 1	Change "method" to --computer-implemented method--.
Claim 7	line 1	Change "method" to --computer-implemented method--.
	line 17	Change object." to --object;--.
	line 18	Add --storing, in conjunction with the level set values representing the signed distance to the nearest surface of said at least one impermeable object, the velocities of the nearest surface of said at least one impermeable object.--.
Claim 8	line 1	Change "method" to --computer-implemented method--.
Claim 9	line 1	Change "method" to --computer-implemented method--, and "where state" to --where a state--.

### ***Reasons for Allowance***

3. The following is an Examiner's Statement of Reasons for the indication of allowable subject matter.

3.1 The instant application is directed to a non-obvious improvement over the invention described in USP 6,266,071, issued to Stam et al., which teaches a method for computer graphic simulation of a fluid in motion, wherein the velocity of the fluid is calculated from input data at a plurality of points at successive time intervals, the velocity values then being used by

**In re Application of: Houston et al.**

an animator module to produce a geometrical description, that is then sent to a renderer module for calculating an image of the scene.

**3.2** The improvement of the present invention comprises a method of including at least one impermeable object in a fluid simulation where a state of a fluid comprised of velocities is updated in a given region over discrete time steps. The improvement overcomes the cited prior art by: identifying surfaces of the impermeable object within the given region; setting velocity values within the impermeable objects; defining a) cells contained within an impermeable object, and b) the closest fluid containing cells within the fluid; assigning values copied from the closest fluid containing cells to cells within the impermeable object; assigning a value to the velocity vectors of cells within the object; and removing the normal component of the cells within the object when motion of the fluid is into the object. These patentable distinctions are included in independent claim, no. 1. In another embodiment, independent claims 7 and 9 claim a method of incorporating impermeable objects in to fluid simulation, including identifying surfaces of the impermeable objects within the given region of fluid simulation, wherein the impermeable object is defined as a level set including values representing a distance to the nearest surface of an impermeable object.

**3.3** The art of record, either individually or in combination, fails to teach, suggest, or render obvious the useful, concrete and tangible method of including at least one impermeable object in a fluid simulation where a state of a fluid comprised of velocities is updated in a given region over discrete time steps, having the corresponding structure which is disclosed in the specification and equivalents thereof at least at page 11, line 7 through page 15, line 12, and Figures 1-9. In view of the foregoing, the claims of the present application are found to be patentable over the prior art.

In re Application of: Houston et al.

***Response Guidelines***

4. Any comments considered necessary by applicant **MUST** be submitted no later than the payment of the Issue Fee and, to avoid processing delays, should preferably accompany the Issue Fee. Such submissions should clearly be labeled "Comments on Statement of Reasons for Allowance".

**4.1 Any response to the Examiner in regard to this allowance should be**

**directed to:** Russell Frejd, telephone number (571) 272-3779, Monday-Friday from 0530 to 1400 ET, or the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279. Inquires of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist (571) 272-2100.

**mailed to:** Commissioner of Patents and Trademarks  
P.O. Box 1450, Alexandria, VA 22313-1450

**or faxed to:** (571) 273-8300

*Hand-delivered responses should be brought to the Customer Service Window, Randolph Building, 401 Dulany Street, Alexandria, VA, 22314.*

**Date:** 2-March-2007

  
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**RUSSELL FREJD  
PRIMARY EXAMINER**